

Krishna Damodar Abhyankar (1928–2007)

India has a rich tradition in astronomy and mathematics which goes back to the period of the *Vedas*. Krishna Damodar Abhyankar got attracted to the stars in his childhood, when his father pointed out to him the *Saptarishis* (the Great Bear), *Dhruva* (the Polaris) and the 27 *Nakshatras* (lunar mansions), which have been in use in India for thousands of years since Vedic times. Abhyankar later said, 'It is these Nakshatras and not the right ascensions of stars which still help me to orient myself in the sky'.

Abhyankar was born on 21 June 1928 in Indore, Madhya Pradesh. He was always an outstanding student. He received gold medals for securing the first rank in both High School and Intermediate examinations. He received MSc degree in physics from Agra University in 1951. He then worked for a short while at Holkar College, Indore as a junior lecturer. He was interested in research and got the opportunity to work as a Senior Research Fellow at Kodaikanal Observatory during 1952–54. During this period he worked on the problems of the Sun and also studied basic astrophysics. He determined the difference between the Sun's temperature at the pole and at the equator using Woolley's method of Ca ionization. He also determined the excitation temperatures of sunspots for Fe 1 and Cr 1 using a curve-of-growth procedure.

Abhyankar received a scholarship from the University of California at Berkeley for working towards his Ph D degree. He worked under the supervision of Otto Struve from 1954 to 1958, and submitted a thesis on 'A study of some close binary systems'. He had studied some close binary stars with the aim of understanding stellar evolution. He discovered a short-period variable AD CMi. Abhyankar was awarded the Ph D degree in astronomy in 1959. He spent one more year at Berkeley as Junior Astronomer and worked on the problem of the stability of the straight-line solutions in the restricted three-body problem.

On his return from USA, Abhyankar worked for a short while at Kodaikanal Observatory and then joined Osmania University as Reader in 1960. Soon after, in 1960 he married Shailaja, who remained his affectionate companion throughout his life.

At Osmania University, teaching of astronomy started in 1959 at the under-

graduate level. Abhyankar worked with great enthusiasm to introduce the teaching of astronomy at both undergraduate and postgraduate levels. He and M. B. K. Sarma were the only two faculty members who carried out all the teaching initially. Abhyankar enjoyed teaching and hence this was a welcome challenge. He also spent considerable effort in selecting a suitable site at Rangapur for the installation of a new 48-in telescope, which was at that time the largest telescope in India.



Abhyankar then spent a year (1963–64) at David Dunlop Observatory, Toronto, Canada as a postdoctoral fellow, where he carried out theoretical work on the Schuster problem for moving stellar atmospheres. He was made a full professor in astronomy on his return from Canada in 1964, a post which he held with distinction until his retirement in 1988.

Abhyankar worked at the NASA Jet Propulsion Laboratory at Pasadena, USA from 1967 to 1970 as Senior Postdoctoral Resident Research Associate where he wrote a series of papers in collaboration with A. Fymat. This work was mainly on the theory of scattering in inhomogeneous and imperfect Rayleigh scattering atmospheres. The technique was later used in the study of planetary atmospheres.

Abhyankar worked largely on stellar atmospheres and binary stars. His theoretical work on stellar atmospheres has been widely published and is well recognized. His work in the field of binary stars is also of a high standard and has inspired many others to adopt this line of research. It was befitting that soon after his retirement, an International Workshop on Binary Stars and Stellar Atmospheres

was held in his honour at Osmania University, Hyderabad in August 1989.

Abhyankar was a good observational astronomer and a good theoretical astrophysicist. He published more than 150 research papers and written numerous popular articles. Eight research scholars obtained Ph D degrees under his supervision.

The following are some of his important contributions:

(a) He made photometric, spectroscopic, spectrophotometric and period studies of about three dozen eclipsing and variable stars with a view to determine their orbital parameters, absolute dimensions and evolutionary status.

(b) He solved several problems in radiative transfer in moving inhomogeneous and imperfectly scattering semi-infinite and finite atmospheres.

(c) He calculated the intensity and polarization line profiles in planetary and terrestrial atmospheres.

(d) He made MK morphological study of Am stars which led to the discovery of a transitional class between Ap and Am stars as well as classification of the Am stars into subgroups.

(e) He developed a method of using the Fourier transform spectroscopic method for determining the Stokes parameters of polarization as a function of wavelength in the optical region.

Abhyankar wrote four books, two of which (*Astrophysics – Stars and Galaxies* (1992) and *Astrophysics of the Solar System* (1999)) were published during his lifetime. The third book on *Pre-Siddhantic Indian Astronomy* was released after he passed away. The fourth book on *An Overview of Basic Theoretical Physics* written in collaboration with A. W. Joshi is under publication.

Teaching of astronomy was dear to Abhyankar. His lucid exposition made his lectures interesting. He always emphasized on broad-based training in all branches of astronomy, instead of concentrating on one or two topics that are of interest to the teachers. He also tried to stimulate interest in the field of ancient Indian astronomy among the active astronomers in India. He was the national representative of India to IAU Commission on 'Teaching of Astronomy' for many

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years. He emphasized that astronomy should be taught in schools and colleges. He gave talks on the All-India Radio and wrote popular articles in Marathi.

Abhyankar served as the Director of Nizamiah and Rangapur Observatories and as Head, Department of Astronomy during 1961–63 (in charge), 1973–81 and 1986–88 until he retired in 1988. The 48-inch telescope was most fruitfully utilized by the department staff and scientists from other institutions as well. Abhyankar served as Dean, Faculty of Science, Osmania University during 1977–80. He also served as a member of the Osmania University Syndicate. He was a person of impeccable honesty and integrity, and discharged his duties efficiently.

After his retirement, Abhyankar worked as UGC Emeritus Professor from 1989 to 1991. During 1995–98 he worked on an

INSA project entitled 'New light on Pre-Siddhantic astronomy'.

Abhyankar initiated the formation of the Astronomical Society of India and served the Society in various capacities.

Abhyankar has been a member of the International Astronomical Union, Royal Astronomical Society, Astronomical Society of the Pacific, Indian Academy of Sciences and Indian National Science Academy. He was founder member of Andhra Pradesh Academy of Sciences and Maharashtra Academy of Sciences.

Abhyankar received the Best Teacher Award from the Andhra Pradesh Government; NSSA Award for patent rights on a new technique of measuring optical polarization; INSA Vainu Bappu Award and the M. P. Birla Award.

I was fortunate to be a colleague of Abhyankar since 1964. He was a friend,

philosopher and guide for us and we held him in high esteem. He had an intense desire that astronomy should spread and flourish in India. He worked actively towards this goal until the end. Abhyankar passed away in Hyderabad on 8 November 2007, leaving behind an inspiring example of exemplary dedication to science.

'Surely to God we belong and to Him shall we return' (*The Quran*, Chapter 2, Verse 157).

SALEH MOHAMMED ALLADIN

*Baitul Ehsan,
Mohalla Ahmadiyya,
Qadian 143 516, India
e-mail: salehhafiz@yahoo.co.in*



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